

ABSTRACT OF THE DISCLOSURE

In one aspect of the present invention discloses a dual-stiffness damping system for an evacuated energy storage system, the damping system comprising one or more flexible dampers and a plurality of more rigid bumpers, and a method of damping an evacuated energy storage system using dual-stiffness damping. Indeed, under normal operating conditions, a flexible damper, having a stiffness of about 500 lb/in to about 4000 lb/in, minimizes the rigid body critical speed of the rotor assembly of the energy storage system, allowing relative displacement between the stator assembly and rotor assembly but preventing the assemblies from physically contacting each other. Under more extreme external loading conditions, e.g., during an earthquake, the plurality of more rigid bumpers, having a stiffness of about 50,000 to 250,000 lb/in, engages the outer race of the bearing assembly to arrest further relative displacement substantially. In another aspect of the present invention, the dual stiffness damping system is combined with a bearing assembly and a mounting unit to produce a self-contained damping system that can be quickly and easily installed and replaced.

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